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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/621,505	07/17/2003	Toshiaki Yoshihara	1100.68143	1976

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EXAMINER
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DUONG, THOI V

ART UNIT	PAPER NUMBER
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2871

DATE MAILED: 08/04/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/621,505	<b>Applicant(s)</b> YOSHIHARA ET AL.	
	<b>Examiner</b> Thoi V. Duong	<b>Art Unit</b> 2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 18 May 2006.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-7 and 14-17 ~~is/are~~ pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 14-17 ~~is/are~~ rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

1. This office action is in response to the Amendment filed May 18, 2006.

Accordingly, claims 1 and 14 were amended, claims 8-13 were cancelled, and new claims 16 and 17 were added. Currently, claims 1-7 and 14-17 are pending in this application.

#### ***Claim Objections***

2. Claims 16 and 17 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim.

Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claims 16 and 17, which are dependent on claims 1 and 14 respectively, recite the limitation "the cooling of said liquid crystal is at a rate of 0.5 degree C /minute or less." This limitation is beyond "cooling said the liquid crystal at a rate of 3 to 10 degrees C/minute" recited in claims 1 and 14. Therefore, claims 16 and 17 fail to further limit the subject matter of claims 1 and 14.

#### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-6 and 14-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 2000-275685 (JP'685) in view of Bradshaw et al. (Bradshaw, USPN 5,061,047).

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Re claims 1 and 14, as shown in Fig. 1, JP'685 discloses a liquid crystal display device 70 (as well as a manufacturing method of the same) comprising two substrates 81a and 81b sandwiching a liquid crystal 85 having spontaneous polarization (paragraphs 106 and 129), and electrodes 82a and 82b for applying a voltage to said liquid crystal (paragraph 31),

wherein said liquid crystal shows a monostable state in which an average molecular axis of a director of liquid crystal molecules is aligned in a single direction and present in a first position when no voltage is applied, shows a state in which the average molecular axis is tilted in one direction from the first position at an angle corresponding to a magnitude of a voltage of a first polarity and present in a second position (first brightness) when the voltage of the first polarity is applied, and shows either a state in which the average molecular axis maintains the first position or a state in which the average molecular axis is tilted in a direction opposite to said one direction from the first position and present in a third position (second brightness) when a voltage of a second polarity opposite to the voltage of the first polarity is applied (see Abstract),

wherein, said liquid crystal is introduced between said two substrates (paragraph 102);

wherein a phase sequence of said liquid crystal is isotropic phase – cholesteric phase – chiral smectic C phase from a higher-temperature side (paragraph 94); and

wherein, an alignment treatment (application of an electric field to the liquid crystal during a cooling process) is performed to bring said liquid crystal into the monostable state by cooling and by providing a period in which the temperature of said

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liquid crystal is kept within a temperature range showing the cholesteric phase during cooling, after heating said liquid crystal to a temperature of the isotropic phase thereof (paragraphs 11, 39, 102, 106 and 137).

However, JP'685 does not disclose a temperature range of the cholesteric phase of the phase sequence of said liquid crystal having a temperature width of not less than 3 degrees C and a cooling rate of 3 to 10 degrees/minute as recited in claims 1 and 14.

Bradshaw discloses a liquid crystal having a temperature range of a cholesteric phase of a phase sequence "isotropic phase 135 degrees - Cholesteric phase 56.1 degrees - chiral smectic C phase 20 degrees" of a liquid crystal having a temperature width of not less than 3 degrees C (col. 16, lines 16-19). Bradshaw also suggests an alignment treatment performed by cooling said liquid crystal at a rate of less than 20 degrees C/minute within +/- 5 degrees C of the cholesteric/smectic phase transition (col. 14, lines 33-35) and by providing a period in which the temperature of said liquid crystal is kept within a temperature range (56.1 degrees) showing the cholesteric phase during cooling, after heating said liquid crystal to a temperature of the isotropic phase thereof (135 degrees), as shown in the example 10 in col. 13, lines 1-13. Accordingly, the cooling rate of less than 20 degrees C/minute includes the claimed range of 3 to 10 degrees C/minute.

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the liquid crystal display device of JP'685 with the teaching of Bradshaw by employing a liquid crystal having a temperature range of

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the cholesteric phase of the phase sequence of said liquid crystal having a temperature width of not less than 3 degrees C and a cooling rate of less than 20 degrees C/minute in order to provide a fast switching display with uniform alignment (see Abstract).

Re claim 2, Bradshaw discloses that the temperature range of the cholesteric phase of the phase sequence of said liquid crystal has a temperature width of not less than 5 degrees C (col. 16, lines 16-19).

Re claim 4, Bradshaw discloses that the temperature range of the cholesteric phase of the phase sequence of said liquid crystal has a temperature width of not less than 10 degrees C (+/- 5 degrees C) (col. 14, lines 33-35).

Re claims 3, 5 and 6, Bradshaw discloses that said liquid crystal is a ferroelectric liquid crystal (Abstract and col. 5, lines 25-28).

Re claim 15, JP'685 discloses that the alignment treatment is performed after heating said liquid crystal to an isotropic phase (paragraph 137).

Re claims 16 and 17, Bradshaw discloses that during the period when said liquid crystal is kept within a temperature range showing the cholesteric phase during cooling, the cooling of said liquid crystal is at a rate of between 0.5 degree and 2 degrees C/minute (col. 2, lines 56-58 and col. 14, lines 36-38). This meets the claimed rate of 0.5 degree C/minute or less.

5. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP 2000-275685 (JP'685) in view of Bradshaw et al. (Bradshaw, USPN 5,061,047) as applied to claims 1-6 and 14-17 above and further in view of Yoshinaga et al. (Yoshinaga, USPN 6,791,527 B2).

As shown in Figs. 1 and 5, the liquid crystal display device of JP'685 comprises a data-writing scanning voltage (or voltage of first polarity) and a data-erasure scanning voltage (or voltage of second polarity opposite to the first polarity) applied to the electrodes 82a and 82b (Abstract).

Bradshaw also discloses that the device further includes means for applying two d.c. voltages of opposite polarity to the electrode structures (col. 3, lines 15-20).

However, the liquid crystal display device of JP'685 as modified in view of Bradshaw does not disclose a back-light driven by a field-sequential color scheme.

Yoshinaga discloses a liquid crystal display device comprising a back-light driven by a field-sequential color scheme for effecting color display (col. 5, lines 35-49).

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the liquid crystal display device of JP'685 with the teaching of Yoshinaga by employing a back-light driven by a field-sequential color scheme in order to effect color display based on a timewise additive process and obtain a display free from a color filter (col. 5, lines 35-49).

### ***Response to Arguments***

6. Applicant's arguments filed May 18, 2006 have been fully considered but they are not persuasive.

Applicant argued that Bradshaw does not teach any cooling procedure once the temperature of the liquid crystal is kept within a temperature range showing either the cholesteric phase or the chiral nematic phase during cooling.

The Examiner disagrees with Applicant's remarks.

At first, JP'685 to Shimizu discloses a liquid crystal display device in which an alignment treatment (application of an electric field to the liquid crystal during a cooling process) is performed to bring said liquid crystal into the monostable state by cooling and by providing a period in which the temperature of said liquid crystal is kept within a temperature range showing the cholesteric phase during cooling, after heating said liquid crystal to a temperature of the isotropic phase thereof (paragraphs 11, 39, 102, 106 and 137).

Further, as shown in the example 10 in col. 13, lines 1-13, Bradshaw discloses a liquid crystal having a phase sequence "isotropic (135 degrees) Cholesteric (56.1 degrees)  $S_c^*$  (20 degrees)" wherein an alignment treatment is performed by cooling the liquid crystal at a rate of less than 20 degrees C/minute (col. 14, lines 33-35) and by providing a period in which the temperature of said liquid crystal is kept within a temperature range (56.1 degrees) showing the cholesteric phase, after heating said liquid crystal to a temperature of the isotropic phase thereof (135 degrees).

Accordingly, Bradshaw does teach cooling after heating the liquid crystal to a temperature of the isotropic phase. Thus, one skilled in the art would modify the liquid crystal device of Shimizu to cool the liquid crystal with a temperature width of not less than 3 degrees C and a cooling rate of less than 20 degrees C/minute from the isotropic phase-Cholesteric phase-Chiral smectic C phase as taught by Bradshaw so as to realize a fast switching display with uniform alignment (see Abstract).



**Conclusion**

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

**Conclusion**

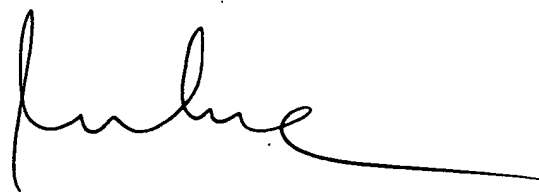
8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thoi V. Duong whose telephone number is (571) 272-2292. The examiner can normally be reached on Monday-Friday from 8:30 am to 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms, can be reached at (571) 272-1787.

Thoi Duong



07/28/2006



DUNG T. NGUYEN  
PRIMARY EXAMINER